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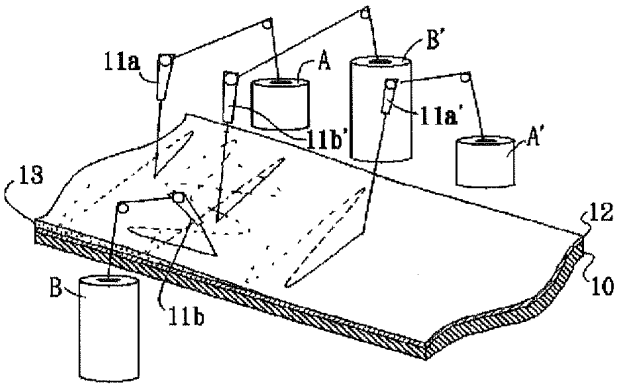
(54)【発明の名称】成形用基材の製造方法

(57)【要約】

【目的】　加熱成形可能な成形用基材、特に軽量で耐熱性にすぐれた構成を得る方法に関する。

【構成】　ガラス長繊維と、熱可塑性樹脂長繊維とを異なる供給装置より、同一のコンベア上に連続的に吹き出し堆積させて形成したマットの両面側に、外側材として不織布を積層付与し、得られた積層物を押圧一体化することで成形用基材を得る製造方法。



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【特許請求の範囲】

【請求項１】　ガラス長繊維と熱可塑性樹脂長繊維とを、異なる供給装置より同一のコンベア上に連続的に吹き出し堆積させて形成したマットの両面側に、外側材として不織布を積層付与して形成した積層物を押圧一体化することを特徴とする成形用基材の製造方法。

【請求項２】　請求項１に記載の成形用基材の製造方法において、熱可塑性樹脂長繊維の供給装置が、溶融状態から紡糸された直後の熱可塑性樹脂繊維が半溶融状態にある間にエアーを吹きつけコンベア上に吹き出すものであることを特徴とする成形用基材の製造方法。

【請求項３】　請求項１および請求項２に記載の成形用基材の製造方法において、コンベア上にあらかじめ第１の不織布を載置しておき、この不織布上にガラス長繊維と熱可塑性樹脂長繊維を吹き出し堆積させてマットを形成した後、上方から第２の不織布を積層付与することで形成した積層物を押圧一体化することを特徴とする成形用基材の製造方法。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】この発明は加熱成形可能な成形用基材に関し、特に軽量で耐熱性にすぐれた構成に関する。

【０００２】

【従来の技術】従来より自動車用ヘッドライナー等の自動車内装材の用途に各種の成形用基材を用いてきた。これらの基材中には熱可塑性樹脂成分ないし熱硬化性バインダーを含んでいて、加熱工程でいったん基材を軟化させた上で、プレス成形型によって所望の形状に成形し、成形後には表面に表皮材を貼着して装飾性を高めたり、成形と同時に表皮材を貼着するものもあった。この種の成形用基材において、しばしば軽量で耐熱性にすぐれる構成が要求される。このような要求特性を満たすため、昨今は熱可塑性樹脂とガラス繊維を用いた基材が多く提案されており、特にガラス繊維との分散性を考慮して熱可塑性樹脂繊維とガラス繊維からなる基材を構成する例が多い。この種の基材としては、たとえば特公平６－２９７６号等にはガラス繊維と熱可塑性樹脂繊維との混合繊維からなる不織繊維マットが示されている。これは一定の耐熱性と成形性をそなえた基材ではあるが、課題としてガラス繊維と熱可塑性樹脂繊維の分散が均一になりにくいことがあり、ために（ガラス）繊維の不足した部分が生じるので、これをうめ合わせようとして全体の目付量を多めに設定して材料歩留りが悪く、重量が増加する傾向があった。また繊維の方向は完全にランダムになるので、基材に方向性を出すことができず、成形後に最大の耐熱性（寸法安定性）を必要とする方向での性能が満たされるまで全体に（ガラスの）目付量を増加させる必要があり、過剰な目付量の部位を生じてこれも重量増加の要因となっていた。また、実公平７－２８２号には

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ガラス繊維薄層と熱可塑性樹脂繊維薄層とを交互に積層しニードル加工した原反からなる基材が示されている。これは、上記の繊維分散の不均一性等の課題を解決しようとするものと思われるが、複数のガラス繊維薄層と熱可塑性樹脂繊維薄層を作製し、交互に積層し、ニードル加工をする等の工程の煩雑化がさけられないうえ、複数の異なった特性の成形用基材を成形する必要がある場合など、ふたたびガラス繊維薄層と熱可塑性樹脂繊維薄層の積層態様を変更することから始めねばならず、効率性に劣る意味があった。

【０００３】

【発明が解決しようとする課題】本発明は上記課題を解決し、熱可塑性繊維とガラス繊維からなる加熱成形可能な軽量基材を得るのに適した製造方法をを提供する。

【０００４】

【課題を解決するための手段】課題を解決する本発明の手段は、ガラス長繊維と熱可塑性樹脂長繊維とを、異なる供給装置より同一のコンベア上に連続的に吹き出し堆積させて形成したマットの両面側に、外側材として不織布を積層付与して形成した積層物を押圧一体化する成形用基材の製造方法、および熱可塑性樹脂長繊維の供給装置が、溶融状態から紡糸された直後の熱可塑性樹脂繊維が半溶融状態にある間にエアーを吹きつけコンベア上に吹き出すものである成形用基材の製造方法、またコンベア上にあらかじめ第１の不織布を載置しておき、この不織布上にガラス長繊維と熱可塑性樹脂長繊維を吹き出し堆積させてマットを形成した後、上方から第２の不織布を積層付与することで形成した積層物を押圧一体化する成形用基材の製造方法による。

【０００５】

【作用】本発明の製造方法によって得られる成形用基材は、ガラス繊維と熱可塑性樹脂繊維を含んで形成されているので、温度依存性の少ないガラス繊維によって耐熱性（寸法安定性）を発揮させ、熱可塑性樹脂繊維によって加熱成形性もある基材であり、特に繊維径が一定値以下にあるガラス長繊維と熱可塑性樹脂長繊維を用いることで、両繊維に十分なしなやかさがあって（かつ両繊維の繊維径が一定値以上あることで両繊維の本来目的とする機能を失わずに）繊維どうしの親和性が増すので、同一のコンベア上に連続的に両繊維を吹き出し堆積させて目付ばらつきの少ないマットを単一の工程で得ることができる。マットの両面側にスパンボンド不織布を付与することで、基材のハンドリング性、剛性、表面の平滑性を向上させる。また繊維の堆積は、ガラス繊維と熱可塑性樹脂繊維をそれぞれ耐熱性、寸法安定性の必要な方向に合わせて配向させる等のことが自由にできるので、構成繊維の機能を最高に高めることができる。また、同一の生産ラインで異なる用途の基材を製造する場合などにも容易に対応できる。

【０００６】

【実施例】以下、本発明の好適な実施例を説明する。図１に本発明の成形用基材の製造工程を示す。コンベヤー１０が一定の速度で移動する上にガラス繊維Ａ、Ａ’および熱可塑性樹脂繊維Ｂ、Ｂ’を吹き出し堆積させマット１３を形成している例である。コンベア上にはあらかじめ基材外側材たる不織布１２が載置されており、コンベアが矢印の方向に一定の速度で移動していくにつれて、次第に不織布上に各繊維が積み重なってマットに形成される。各繊維はそれぞれ繊維供給装置１１ａ、１１ａ’、１１ｂ、１１ｂ’より任意の方向に振り分け吹き出される。ガラス繊維は直径が小さいものが適しており、好ましくは１００マイクロメーター以下、より好ましくは１０マイクロメーター以下のものが適している。熱可塑性樹脂長繊維としてはポリプロピレン繊維、ポリエステル繊維等が適しており繊度は１００デニール以下、より好ましくは５０デニール以下のものが好ましい。繊維の供給装置はエアージェット等公知のものを用いることが可能であり、一定の周期で吹き出し方向を変更することが可能なものである。熱可塑性樹脂繊維を半溶融状態で吹き出した場合は同時に吹き出されるガラス繊維との接着性が向上する。不織布上にマットが形成された後、マット上方から別の不織布（不図示）を配し、マットをはさみ込んで加熱圧縮して一体化し成形用基材とする。

＜実施例１＞

（ガラス繊維）ガラス繊維は、平均直径が９マイクロメーターの長繊維のものであり、２つの供給装置より、それぞれコンベアの流れ方向と同方向および、直交する方向で吹き出し堆積させた。ガラス繊維の目付量は１５０ｇ／m^2 である。

（熱可塑性樹脂繊維）熱可塑性樹脂繊維としては、ポリプロピレンの長繊維であり、繊度は平均１０デニールであり、１つの供給装置よりランダムな方向に吹き出し堆積させた。熱可塑性樹脂繊維の目付量は１５０ｇ／m^2 である。

（外側材）マットの両外側にはポリプロピレン樹脂のスパンボンド不織布を付与した。スパンボンド不織布の目付量はそれぞれ５０ｇ／m^2 である。

（結果）上記の各素材をコンベア上に積層し加熱押圧して得た基材は、厚さが６．０ｍｍで総目付量は４００ｇ／m^2 になった。平均的な絞り深さの自動車天井内装材を成形してみたところ、形状追随性が良く、すぐれた成形性を示した。得られた成形品の剛性は十分な性能があった。

＜実施例２＞

（ガラス繊維）実施例と同一、同量のガラス繊維をコンベヤーの流れ方向に平行に吹き出し堆積させた。ガラス繊維の目付量は２５０ｇ／m^2 である。

（熱可塑性樹脂繊維）熱可塑性樹脂繊維としては、ポリプロピレンの長繊維であり、繊度は平均２０デニールであり、１つの供給装置よりランダムな方向に吹き出し堆積させた。熱可塑性樹脂繊維の目付量は２５０ｇ／m^2 である。

（外側材）実施例１と同一素材、同目付量のスパンボンド不織布を付与した。

（結果）上記の各素材をコンベア上に積層し加熱押圧して得た基材は、厚さが８．５ｍｍで総目付量は６００ｇ／m^2 になった。平均的な絞り深さの自動車天井内装材を成形してみたところ、形状追随性が良く、すぐれた成形性を示した。得られた成形品の剛性は十分な性能があった。この基材の物性は方向によって異なり、特にガラスの配向方向にそっての剛性と寸法安定性が優秀であった。

【発明の効果】本発明によって、最高の効率でガラス繊維補強された加熱成形可能な成形用基材が得られる。ガラス繊維の配向方向を基材の寸法安定性の必要な複数の方向に合わせて最適の効率で配することが可能であり、重量の低減がはかれる。ガラス繊維を熱可塑性樹脂繊維と同時に加工することができ、工程数を低減することができる。

【図面の簡単な説明】

【図１】本発明の成形用基材の製造工程を示す。

【符号の説明】

１０・・・コンベアー

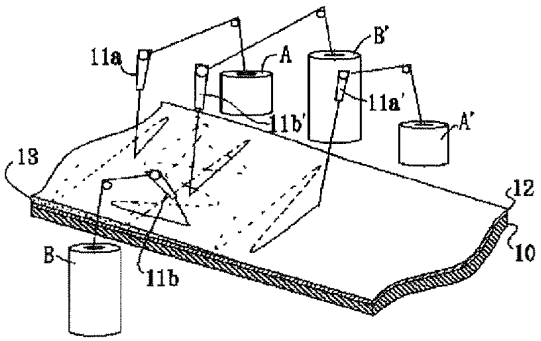
１２・・・不織布

１３・・・マット

Ａ，Ａ’・・・ガラス繊維

Ｂ，Ｂ’・・・熱可塑性樹脂繊維

【図１】



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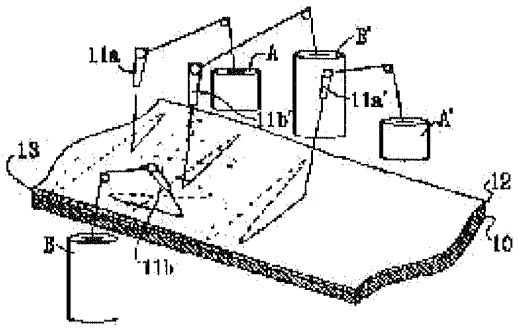
(54) PRODUCTION OF MOLDING SUBSTRATE

(57)Abstract:
PURPOSE: To produce a lightweight molding substrate, excellent in heat resistance by blowing off glass continuous filaments and thermoplastic resin continuous filaments onto the same conveyor, depositing the filaments thereon, forming a mat and laminating nonwoven fabrics onto both surfaces of the resultant mat.
CONSTITUTION: Glass fibers A and A' and thermoplastic resin fibers B and B' are blown off from separate feeders 11a, 11a', 11b and 11b' onto the same conveyor 10 and deposited thereon. A mat is then formed on a nonwoven fabric 12 by a method, etc., for placing the nonwoven fabric 12 which is a substrate outer material on the conveyor 10 and another nonwoven fabric is arranged from the upper part of the mat. The mat is sandwiched therebetween, thermally compressed and integrated to afford the substrate for molding.



* NOTICES *

CLAIMS

[Claim(s)]
[Claim 1]A manufacturing method of a substrate for shaping carrying out the press unification of the laminated material which carried out lamination grant and formed a nonwoven fabric in the both-sides side of a mat which blows off continuously, made continuous glass fiber and thermoplastics continuous glass fiber deposit, and formed them on the same conveyor from a different feed unit as outside material.
[Claim 2]A manufacturing method of a substrate for shaping being what sprays air and blows off on a conveyor while a thermoplastic resin fiber immediately after carrying out spinning of the feed unit of thermoplastics continuous glass fiber from a molten state is in a semi molten state in a manufacturing method of the substrate for shaping according to claim 1.
[Claim 3]In a manufacturing method of claim 1 and the substrate for shaping according to claim 2, the 1st nonwoven fabric is beforehand laid on a conveyor, A manufacturing method of a substrate for shaping carrying out the press unification of the laminated material which formed the 2nd nonwoven fabric by carrying out lamination grant from the upper part after making continuous glass fiber and thermoplastics continuous glass fiber blow off and deposit on this nonwoven fabric and forming a mat.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]About the substrate for shaping in which hot forming is possible, especially, this invention is lightweight and relates to the composition excellent in heat resistance.
[0002]
[Description of the Prior Art]Various kinds of substrates for shaping have been used for the use of automotive interior materials, such as a headliner for cars, from before. After the thermoplastic resin component thru/or the thermosetting binder are included in these substrates and once softening the substrate in the heating process, it fabricated in desired shape with the press-forming type, and the skin material was stuck on the surface after shaping, fanciness was improved and there were some which stick a skin material simultaneously with shaping. In this kind of substrate for shaping, it is often lightweight and the composition which is excellent in heat resistance is required. In order to fulfill such demand characteristics, many thermoplastics and substrates which used glass fiber are proposed these days, and there are many examples which constitute the substrate which consists of a thermoplastic resin fiber and glass fiber especially in consideration of dispersibility with glass fiber. As this kind of a substrate, the non-woven textile mat which consists of mixed textiles of glass fiber and a thermoplastic resin fiber is shown, for example in JP,6-2976,B. Although this is the substrate which offered fixed heat resistance and moldability, Since the portion which wanted textiles (glass) for the sake by the ability of distribution of glass fiber and

a thermoplastic resin fiber not to become uniform easily as a technical problem arose, more whole metsuke amount was set up, the material yield was bad and there was a tendency which weight increases for compensating for this. Since the direction of textiles becomes random thoroughly, directivity cannot be taken out to a substrate, Metsuke amount (glass) needed to be made to increase to the whole until the performance in the direction which needs the maximum heat resistance (dimensional stability) after shaping was filled, the part of superfluous metsuke amount was produced, and this also caused a weight increment. The substrate which laminates a glass fiber thin layer and a thermoplastic resin fiber thin layer to JP,7-282,Y by turns, and becomes it from the original fabric which carried out needle processing is shown. Although it seems that this tends to solve technical problems, such as the heterogeneity of the above-mentioned textiles distribution, Produce two or more glass fiber thin layers and thermoplastic resin fiber thin layers, and it laminates by turns, When complicated-ization of processes, such as carrying out needle processing, was not avoided and also the substrate for shaping of several different characteristics needed to be fabricated, there was a meaning inferior to efficiency starting with changing the lamination mode of a glass fiber thin layer and a thermoplastic resin fiber thin layer again.

[0003]

[Problem(s) to be Solved by the Invention]This invention solves an aforementioned problem and provides ********** suitable for obtaining the lightweight substrate which consists of a thermoplastic fiber and glass fiber and in which hot forming is possible.

[0004]

[Means for Solving the Problem]A means of this invention which solves a technical problem continuous glass fiber and thermoplastics continuous glass fiber, To the both-sides side of a mat which blows off continuously, made deposit on the same conveyor from a different feed unit, and was formed. A manufacturing method of a substrate for shaping which carries out the press unification of the laminated material which carried out lamination grant and formed a nonwoven fabric as outside material, And a manufacturing method of a substrate for shaping which is what sprays air and blows off on a conveyor while a thermoplastic resin fiber immediately after carrying out spinning of the feed unit of thermoplastics continuous glass fiber from a molten state is in a semi molten state, The 1st nonwoven fabric is beforehand laid on a conveyor, and after making continuous glass fiber and thermoplastics continuous glass fiber blow off and deposit on this nonwoven fabric and forming a mat, laminated material which formed the 2nd nonwoven fabric by carrying out lamination grant from the upper part is twisted to a manufacturing method of a substrate for shaping which carries out press unification.

[0005]

[Function]Since the substrate for shaping obtained by the manufacturing method of this invention is formed including glass fiber and a thermoplastic resin fiber, heat resistance (dimensional stability) is demonstrated by glass fiber with little temperature dependence, and hot-forming nature is also a certain substrate by a thermoplastic resin fiber.

By using the continuous glass fiber which has especially a fiber diameter below in constant value, and thermoplastics continuous glass fiber. Since there is sufficient ductility for both textiles and the compatibility of textiles increases (and ** which does not lose the function which the fiber diameter of both textiles makes the original purpose of both textiles by a certain thing beyond in constant value), Both textiles are made to blow off and deposit continuously on the same conveyor, and a mat with little eyes dispersion can be obtained at a single process.

By giving a spun bond nonwoven fabric to the both-sides side of a mat, the handling nature of a substrate, rigidity, and surface smooth nature are raised. Since the deposition of textiles can do freely a thing, such as carrying out orientation of glass fiber and the thermoplastic resin fiber according to the direction which needs heat resistance and dimensional stability respectively, it can improve the function of composition textiles to the highest. When manufacturing the substrate of a use which is different in the same factory line, it can respond easily.

[0006]

[Example]Hereafter, the suitable example of this invention is described. The manufacturing process of the substrate for shaping of this invention is shown in drawing 1. It is the example which the conveyor 10 moves at a fixed speed,

and also blows off, makes glass fiber A, A' and the thermoplastic resin fiber B, and B' deposit, and forms the mat 13. Gradually, on a nonwoven fabric, each textiles are piled up and it is formed at a mat as the substrate outside material slack nonwoven fabric 12 is beforehand laid on the conveyor and the conveyor moves in the direction of an arrow at a fixed speed. Each textiles are distributed in the directions respectively arbitrary in the textiles feed units 11a, 11a, 11b, and 11b, and blow off. What has a small diameter is suitable and 100 micrometers or less of things of 10 micrometers or less are [glass fiber] more preferably suitable preferably. As thermoplastics continuous glass fiber, a polypropylene fiber, polyester fiber, etc. are suitable, and the thing of 50 deniers or less of fineness is more preferably preferred 100 deniers or less. The feed unit of textiles can use publicly known things, such as an air jet, and it is possible to change the blow-off direction a fixed cycle. When a thermoplastic resin fiber is blown off by a semi molten state, an adhesive property with the glass fiber which blows off simultaneously improves. After a mat is formed on a nonwoven fabric, another nonwoven fabric (un-illustrating) is arranged from the mat upper part, and a mat is inserted, heating compression is carried out, and it unifies, and is considered as the substrate for shaping.
<Example 1> (glass fiber) glass fiber is a thing of the continuous glass fiber whose average diameter is 9 micrometers.
It was made to blow off and deposit from two feed units in the flow direction, the direction, and the direction that intersects perpendicularly of a conveyor, respectively.
The metsuke amount of glass fiber is 150 g/m^2.
(Thermoplastic resin fiber) Fineness is an average of 10 deniers, it blew off in the random direction and it was made to be the continuous glass fiber of polypropylene and to deposit it from the feed unit of 1 ** as a thermoplastic resin fiber. The metsuke amount of a thermoplastic resin fiber is 150 g/m^2.
(Outside material) The spun bond nonwoven fabric of polypropylene resin was given to the both outsides of the mat. The metsuke amount of a spun bond nonwoven fabric is 50g[/m] ^{2}, respectively.
(Result) As for the substrate which laminated each of above-mentioned raw materials on the conveyor, and was obtained by carrying out heating press, thickness became 400 g/m^2 at 6.0 mm, as for the total metsuke amount. When the automobile ceiling interior material of the average diaphragm depth was fabricated, shape imitation nature was good and showed the outstanding moldability. The rigidity of the obtained mold goods had sufficient performance.

It blew off in parallel with the flow direction of a conveyor, and the same and tales doses of glass fibers to <Example 2> (glass fiber) example were made to deposit. The metsuke amount of glass fiber is 250 g/m^2.
(Thermoplastic resin fiber) Fineness is an average of 20 deniers, it blew off in the random direction and it was made to be the continuous glass fiber of polypropylene and to deposit it from the feed unit of 1 ** as a thermoplastic resin fiber. The metsuke amount of a thermoplastic resin fiber is 250 g/m^2.
(Outside material) The spun bond nonwoven fabric of the same raw material as Example 1 and the metsuke amount was given.
(Result) As for the substrate which laminated each of above-mentioned raw materials on the conveyor, and was obtained by carrying out heating press, thickness became 600 g/m^2 at 8.5 mm, as for the total metsuke amount. When the automobile ceiling interior material of the average diaphragm depth was fabricated, shape imitation nature was good and showed the outstanding moldability. The rigidity of the obtained mold goods had sufficient performance. The physical properties of this substrate were excellent in the rigidity which is especially along the orientation direction of glass by changing with directions, and dimensional stability.
[Effect of the Invention]By this invention, the substrate for shaping by which glass fiber reinforcement was carried out at the highest efficiency and in which hot forming is possible is obtained. It is possible to double the orientation direction of glass fiber in two or more directions which need the dimensional stability of a substrate, and to allot at the optimal efficiency, and reduction of weight can be aimed at. Glass fiber can be processed simultaneously with a thermoplastic resin fiber, and a routing counter can be reduced.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The manufacturing process of the substrate for shaping of this invention is shown.

[Description of Notations]

10 ... Conveyor

12 ... Nonwoven fabric

13 ... Mat

A, A' ... Glass fiber

B, B' ... Thermoplastic resin fiber

DRAWINGS

[Drawing 1]